NATURE

A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE.

"*To the solid ground*
Of Nature trusts the mind which builds for aye."—WORDSWORTH.

THURSDAY, MAY 2, 1901.

THE PHYSICIAN AS PHYSIOLOGIST.

A Contribution to the Study of the Blood and Blood-pressure. By George Oliver, M.D. London, F.R.C.P. Pp. xii+276. (London: H. K. Lewis, 1901.) Price 7*s.* 6*d.*

IT is to be feared that most medical men who are engaged in the active practice of their profession have little idea of making a practical application of the knowledge of physiology which they were at so great pains to acquire during the student period of their career. There are, however, many exceptions, and prominent amongst them the author of the little work which it is our present purpose to notice. Dr. George Oliver is fortunate in that his sphere of practice has given him leisure during several months in each year to study at length such physiological problems as have appeared to him to bear more directly upon the affections which he has been mainly called upon to treat, and the result of his studies has been a not immaterial addition to our knowledge of the physiology of the circulation and of the blood. Such addition has been obtained largely by the devising of methods which have more immediate applicability to the human subject than those which are in common use in the physiological laboratory. Not that Dr. Oliver has neglected the more strictly scientific study of physiological questions; as is evidenced by his well-known investigations into the functions of the ductless glands. But in the book before us the methods which are described are solely those which, whilst maintaining a high standard of scientific value, have a direct clinical application, and the observations which are given are the results of such application in the normal and occasionally in the abnormal subject, extending over a period of some ten years.

The first method which is described is that for determining the amount of colouring matter (hæmoglobin) in a sample of blood. For this purpose two chief procedures have come into use clinically. The principle of the one is that of taking a standard solution of hæmoglobin of known dilution and diluting the sample of blood to be tested until its tint is similar to that of the standard (method of Hoppe-Seyler, modified by Gowers by the use of a picrocarmin gelatin, standardised to a known strength of hæmoglobin solution). The other proceeds on the principle of diluting the sample of blood to a constant extent and comparing it with glass tinted to resemble solutions of hæmoglobin of known degrees of dilution (method of Fleischl). In practice this method is the more simple and accurate, and has been adopted by Dr. Oliver, who has, however, for adequate reasons discarded the use of a coloured glass wedge which is the characteristic of Fleischl's hæmometer, and has adopted, instead, a series of coloured glass discs which represent gradations (percentages) in the amount of hæmoglobin of blood as compared with the normal. One of the most important reasons for this modification of the method is of great scientific interest; for it was found by Dr. Oliver, when making observations with Lovibond's tintometer on the mixture of colours required to reproduce exactly the tint of solutions of hæmoglobin of different strengths, that it is not possible to take a glass of a tint the same as that of a fairly strong solution of hæmoglobin and, merely by decreasing its thickness, to imitate the colour of a very weak solution, but that it is necessary, also, to alter the tone of colour with the change in strength of the solution, *e.g.* for comparison with weaker solutions of hæmoglobin it is necessary to add more yellow to the tint of the glass standards which are used for comparison with stronger solutions. The second method described is one for rapidly computing the number of coloured corpuscles in a given sample of blood. The older method depends upon the actual counting of the number in a measured quantity of blood diluted to a known amount with an isotonic solution of salts; indeed, all methods of computation must be standardised by this one. But such computation is laborious and takes some 15 minutes at the very least, whereas by the procedure devised by Dr. Oliver a satisfactory result can be obtained in less than 5 minutes. The method takes advantage of the fact that the coloured corpuscles of the blood impart opacity to any fluid in which they are suspended in sufficient number, and with normal blood taken as the standard a less or greater

percentage of corpuscles than the normal can be at once arrived at with considerable accuracy by determining at what dilution the flame of a candle can be seen through the mixture. By the employment of this method Dr. Oliver has made many determinations of the percentage (as compared with normal) of corpuscles in blood taken under different conditions both in health and disease, the chief of these varying conditions being those relating to time of day, rest and exercise, digestion, temperature and altitude. It is known that the number of red corpuscles per cubic millimetre may rise from 4,500,000 at sea-level to 7,000,000 or 8,000,000 at elevations of from 6000 to 14,000 feet above sea-level. This has been determined by Viault on the Cordilleras and by Egger and others on the Alps, and is confirmed by the author, o finds that the increase is apparent within 24 hours and attains its maximum within the first week. It is, owever, not as great as had been supposed; part of the former results depending upon an inaccuracy (at low barometric pressures) in the instrument usually employed for enumeration, an inaccuracy not shared by the cytometer employed in these investigations. The description of these two methods and their results occupies nearly one half of the book, the other half being taken up by a description of methods for investigating the condition of the blood-vessels.

Of these the first is one for determining the average blood-pressure in the arteries. It is based upon the ascertained fact that any instrument which is used to observe the arterial pulse by external application gives the largest indications of pressure variations when the force with which it is itself pressing upon the artery is equivalent to the average blood-pressure within the vessel. This principle has already been employed for gauging the blood-pressure in man by Mosso and others, but the instrument which has been contrived by Dr. Oliver for the purpose, and which he called a "hæmodynamometer," is both more sensitive and more easy of application than most others which have been devised, the pressure being applied to a spring through an india-rubber bag or pad filled with fluid, and the indications being directly read off upon a dial (as in Hill and Barnard's original sphygmoscope). An even more ingenious instrument is the "arteriometer," which directly and with great accuracy measures the calibre of an artery, such as the radial, through all the tissues which cover it. Dr. Oliver has, with the aid of these instruments, recorded a very large number of observations upon the effects upon blood-pressure and upon the arteries of varying physiological conditions such as posture, exercise, emotions, rest and sleep, fatigue, food and digestion, temperature and climate; for the details of these and for many other observations on the effects upon the circulatory system of baths, massage and various other forms of treatment the interested reader is referred to the account which the author has himself given. The book furnishes an excellent illustration of what can be done by the scientific physician for the advancement of physiological knowledge, and its perusal will repay, not only the clinician for whom it is primarily intended, but also the physiologist who desires to compare the results which he obtains by experiments upon animals with those which can be obtained by experiments upon man. E. A. S.

A GERMAN NATURALIST IN THE WEST INDIES AND AMERICA.

Von den Antillen zum Fernen Westen; Reiseskizzen eines Naturforschers. By F. Doflein. Pp. iv + 180. Illustrated. (Jena: G. Fischer, 1900.) Price M. 6.50.

WHILE containing little or nothing in the way of absolute novelty, this narrative of the travels of a German naturalist in the West Indies, Mexico, California, and the far North-West of America is a pleasantly written and charmingly illustrated volume which can scarcely fail to interest and attract a large number of his fellow-countrymen. According to the author, German travellers but seldom visit the countries through which he passed, so that the greater part of what he has to tell will be new to the majority of his readers. With the exception of two, the originals of the photographic illustrations, which add so much to the attractiveness of the volume, were taken by the author himself; and the exquisite manner in which these photographs have been reproduced reflects the highest credit on the firm to whom the task was entrusted.

The first part of the book, which is divided into seven chapters, is devoted to the West Indies, where Martinique was the first island visited. Here the author was much interested in the botanical gardens, where he was struck by the richness of the vegetation, and especially by the luxuriance of the lianas. Several charming views in the island are given.

The author's next point was Barbadoes, where he left the great ocean steamer to take passage in a smaller vessel for a cruise among the lovely isles of the Lesser Antilles group. After devoting several chapters to his experiences among these, the narrator discusses in the sixth the racial problems presented by the West Indies, illustrating a few characteristic types. In Chapter vii. he treats of the fauna of the Lesser Antilles, dwelling on the close connection existing between the animals of that group and those of Venezuela, Colombia and Central America, and giving good pictures of a few of the more remarkable forms, among them the dreaded *fer-de-lance* snake. A section of this chapter describes in some detail the coast fauna of Martinique, a striking feature of this part being the photograph of a tropic-bird in flight.

The remaining nine chapters, forming the second half of the volume, describe the continental portion of the author's tour, and are at least as full of interest as their predecessors. In the first of these chapters (viii.) we have an instructive sketch of the ancient buildings and weapons of Mexico, which the author calls the Pompeii of America. In addition to a view of the celebrated temple of the sun and photographs of stone weapons, the author gives a plate of human and animal clay masks collected by himself at Teotihuacan. In Chapter ix. we have a description of a traverse of the great desert tract of Mexico, illustrated by an excellent photograph of giant cactuses; while, in striking contrast to this, the reader, in Chapter x., is introduced to the glories of a summer's day in California. Following the latter is a description of a Chinese settlement in the same country, where the photograph of "Chinatown" will not fail to impress the reader with the importance assumed by the Mongolian